REMARKS

The undersigned thanks Examiner Thu Nguyen for granting, on 16 August 1999, a phone interview regarding this application.

The specification has been amended to correct a minor typographical error. Accordingly, Applicant respectfully request that the above amendment to the specification be approved. Applicant submits that no new matter has been added by virtue of the amendment to the specification.

Twenty-one (21) claims were originally filed in this case, and all claims were rejected in the first office action. In response to the first office action, Applicant amended claims 1, 6, and 12. In the final office action, the Examiner indicted that all claims continue to stand rejected. Reconsideration of the application in view of the above changes and the following remarks is respectfully requested.

In paragraph 2, the Examiner rejected Claims 1-21 under 35 U.S.C. 103(a) as allegedly being unpatentable over Accad (U.S. Patent No. 5,553,200) in view of Smith et al (U.S. Patent No. 5,644,661). The Applicant respectfully traverses this rejection for the reasons presented below.

Applicant has amended claims 1 and 6 to include a similar recitation stating that the ramp value includes a number of logic one values indicative of the discrepancy between the desired eight bit color shade value and the truncated (or first) color shade value, which is not taught or suggested by the art of record. Claims 1 and 6 now substantially recite limitations that have been set forth in

dependent claim 7, as originally filed. Therefore, the above amendments to claims 1 and 6 raise no new issues.

In particular, claim 1 now recites:

> 1. A method for dithering color in a graphics system that displays a group of pixels and wherein the color of the pixels is represented by color shades having fewer than eight bits, the method comprising the steps of:
>
> (a) generating an eight bit color shade value for each pixel representing a desired color for each pixel;
>
> (b) truncating the desired eight bit color shade value to obtain a truncated color shade value;
>
> (c) generating a FRAC value for each pixel from the truncated bits of said eight bit color shade value;
>
> (d) producing a ramp value for each pixel using said FRAC value to select one from a group of plurality of ramp values having different probabilities reflecting proximity to the truncated color shade value, wherein said ramp value encodes a discrepancy between the desired eight bit color shade value and the truncated color shade value and ***includes a number of logic one values indicative of said discrepancy between the desired eight bit color shade value and the truncated color shade value***; and
>
> (e) using a bit from said ramp value to select a color shade value of fewer than eight bits that determines the color of each pixel.

Similarly, Applicant has amended claim 12 to include a similar recitation stating that the ramp value includes a number of logic 1 values indicative of the discrepancy between the desired eight bit binary representation and the binary representations having fewer than eight bits. Claims 12 now substantially recites limitations that have been set forth in dependent claim 17, as originally filed. Therefore, the above amendment to claims 17 raises no new issues.

The claimed invention is not disclosed by Accad and Smith, either alone or in combination. The Examiner notes that Accad teaches a method for dithering color in a graphics system that displays a group of pixels with less eight bits, and including the steps of: generating

an eight bit color shade for each pixel representing the desired color for the pixel (col. 7, lines 60-64); truncating the desired eight bit color shade to obtain a truncated color shade (col. 8, lines 4-8); generating FRAC and ramp value I''(i,j) for each pixel, where the ramp value encodes a discrepancy between the desired eight bit color and the truncated color shade value (col. 12, lines 1-45).

The Examiner also correctly notes that Accad does not teach a binary ramp value having different probabilities which reflect proximity to the truncated color shade value. In an attempt to overcome the deficiency of Accad, the Examiner relies on Smith to show ramp values having different probabilities which reflect proximity to the truncated color shade value.

However, as the Examiner correctly notes, Smith calculates a probability value using the distance between an intermediate pixel and primary pixels in order to determine the pixel value of the intermediate pixel. Smith does not disclose or suggest, as substantially recited in claims 1 or 6, *a ramp value that encodes a discrepancy between the desired eight bit color shade value and the truncated color shade value, and the ramp value further including* ***a number of logic one values indicative of the discrepancy between the desired eight bit color shade value and the truncated color shade value.*** Claim 1 further recites *using a bit from the ramp value to select a color shade value of fewer than eight bits that determines the color of each pixel.* In contrast, Smith discloses determining probabilities for a color value for any individual pixel "s" based upon a distance x,y of the pixel s from a pixel "C".

Similarly, for the similar reasons stated above, Smith does not disclose or suggest, as substantially recited in claim 12, *a ramp value encoding a discrepancy between the desired eight bit binary representation and the binary representations having fewer than eight bits, and the ramp*

value further including ***a number of logic 1 values indicative of the discrepancy between the desired eight bit binary representation and the binary representations having fewer than eight bits.***

For the reasons stated above and in the previous amendment, Applicant submits that Claims 1, 6, and 12 are patentably distinct over Accad in view of Smith. Therefore, Applicant request allowance of Claims 1, 6, and 12. Claims 2-5, 8-11, 13-16, and 18-21 include additional limitations further defining the claimed invention. Based on these limitations and their dependence on their respective base claims, Applicant submits that Claims 2-5, 8-11, 13-16, and 18-21 are likewise in a condition for allowance. Claims 7 and 17 have been canceled.

For the foregoing reasons, Applicants respectively submit that the Claims 1-6, 8-16, and 18-21 are enabled by the specification, that they do define the invention with sufficient particularity and distinctiveness to be patentable, that the indicated claims are in condition for allowance, and accordingly allowance of these pending claims is hereby solicited.

The Examiner also notes that Smith and Accad are combinable because Accad teaches using a FRAC value I" (i,j) to determine the distance between an intermediate pixel and the nearest two primary color pixels (col. 11, lines 64-65 and col. 12, lines 20-39) and Smith teaches determining the probability of number of pixels having a primary color using the distance between the primary colors. The Examiner further states that a person of ordinary skill in the art at the time the invention was made would have been motivated to combine Smith and Accad to aid selecting the intermediate pixel values such that the number of pixels holding the primary color value follow the probability, and the integration of the colors between the two primary color level creates the color near to the original 8 bit color value.

Applicant submits that there is no suggestion or incentive to combine Accad and Smith for the following reasons. First, Accad makes no suggestion to modify his apparatus to generate a binary ramp value having different probabilities which reflect proximity to the truncated color shade value, let alone a ramp value further including a number of logic one values indicative of the discrepancy between the desired eight bit color shade value and the truncated color shade value.

Second, the combination of Accad and Smith is improper since the combination would require a substantial reconstruction and redesign of the elements shown in Accad. (See MPEP 2143.01). In particular, Figure 4 of Accad shows a computer system for implementing a method for reducing the bit rate of original image data into coded image data. There is no suggestions in the references on how to modify Accad's computer system to work with the image interpolator of Smith. Furthermore, the references do not suggest or disclose any interface circuitry, systems or techniques that permit Accad's computer system to function with Smith's image interpolator system and method. Therefore, the combination of Accad and Smith is improper.

Applicant believes that this application is now in condition for allowance of all claims remaining herein, Claims 1-6, 8-16, and 18-21 as amended, and therefore an early Notice of Allowance is respectfully requested. In the event that the Examiner continues one or more of his rejections, however, she is respectfully requested to enter the amendments into the case at this time in order to clarify the issues for appeal. If the Examiner believes that direct contact with applicant's attorney would help advance the prosecution of this case to finality, she is invited to telephone the undersigned at the number given below.

The Applicant also hereby requests and petitions for an extension of time of two (2) months for this amendment in response to the final official action mailed 15 April 1999.

Attached herewith is a check of $380 for the requisite extension fee. Please charge any additional fee required under 37 CFR 1.16 and 1.17 or credit any over payments to deposit account number 19-2555.

Respectfully submitted,
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